

ENGELMANN SPRUCE WEEVIL *Pissodes strobi*



Introduction

The Engelmann spruce weevil (ESW), also known as the spruce weevil or white pine weevil (Figure 1), is a beetle that can cause severe damage to the terminal growth of native and ornamental spruces and certain pines.



Figure 1. *Engelmann spruce weevil* adult. (Photo by L. Livingston, IDL)

Engelmann spruce weevil occurs throughout northern North America and is a particular problem in smaller trees, such as those found in forest regeneration, seed orchards, and Christmas tree plantations. In the western United States the principal hosts are spruces (Engelmann, blue and Sitka spruces), while in the Midwest and Northeast, pines are the preferred hosts, especially eastern white pine.

Damage is usually confined to the terminal growth or, rarely, upper-side branches, and repeated top-kill can give the trees a dense, bushy appearance (Figure 2).

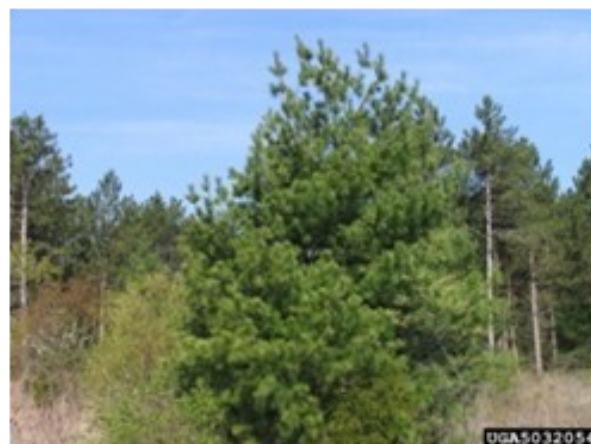


Figure 2. *Bushy appearance of eastern white pine after ESW attack.* Photo by J. Obrien USFS www.bugwood.org

Engelmann spruce weevils usually do not attack trees that are taller than 30 feet. Open-grown trees are preferred, and in certain areas, infestations are so heavy that regeneration with Engelmann spruce may be impractical.

Biology

Engelmann spruce weevil has one generation per year and overwinters as an adult in leaf litter or other protected places around the base of the host tree. In the spring (April-June), adults emerge to begin feeding on the previous year's terminal growth. Eggs are then laid in these feeding punctures and hatch in approximately 7-10 days. The developing

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larvae feed underneath the bark and tunnel in the pith, mining the new growth until pupation. Larval feeding girdles the terminal, and by late summer, the new growth wilts, the needles turn red and eventually drop. The pupal stage takes place in a chamber lined with excelsior-like frass called a “chip cocoon” (Figure 3).



Figure 3. Larvae and pupal chambers (note “chip cocoons.”) Photo by W. Cranshaw CSU, www.bugwood.org

The chip cocoon is located under the bark, partly inside the sapwood and is a distinguishing feature of ESW infestations. Adults emerge in late summer or early fall, and may feed on needles or buds before seeking sheltered places to overwinter.

Insect Recognition

Engelmann spruce weevil is one of approximately 20 species of closely related weevils in the genus *Pissodes*. A closely related species, *P. terminalis*, attacks lodgepole pine in the northern Rockies.

ESW adults are mottled brown-and-white beetles with elongated, downward pointing mouthparts (Figure 4).



Figure 4. Adult Engelmann spruce weevil. Photo by E.B. Walker, VT DFPR, www.bugwood.org.

Larvae are legless white grubs approximately 10 mm long, with brown head capsules and are very similar in appearance to bark beetle larvae (Figure 3). The presence of a chip cocoon (with or without pupae inside) in the terminals of spruce or white pine is diagnostic and will confirm the identification. Pupae are cream colored and resemble adults (Figure 5).



Figure 5. Cream colored pupae inside chip cocoon. Photo by S. Munson USFS www.bugwood.org

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Figure 6. Pitch flow associated with feeding punctures and egg laying activity. Photo by E.B. Walker, VT DFPR, www.bugwood.org.

Damage is typically confined to the terminal leader or larger lateral leaders in the upper crown. Feeding punctures early in the season will often ooze sap, and this is an early indicator of infestation (Figure 6).

Another characteristic of attack is the wilting of the current year's terminal growth, which may resemble a "shepherd's crook" (Figure 7). Larval feeding usually kills the last two year's growth.

As these infested leaders die, healthy lateral branches assume apical dominance. Infested trees are rarely killed outright, but may have such poor form that they are unsuitable for reforestation or landscape use (Figure 8). The dead tops can persist for several years and can become an entry point for decay fungi. Chip cocoons can remain on the tree for several years and are good indicators of previous attack.

Management

Control of this pest is difficult, especially in areas with a history of infestations. Since ESW prefers open-grown trees, close spacing and replanting in small blocks that limit available light can



Figure 7. Killed terminal with "shepherd's crook" form. Photo by W. Cranshaw CSU www.bugwood.org.

reduce weevil damage. In the eastern United States, replanting eastern white pine at high stocking levels (800-1200 trees per acre) has been effective at reducing ESW damage. In tree farms or Christmas tree plantations, chemical control may be possible using products labeled for control of bark beetles. Applications should be applied prior to adult emergence and egg-laying (spring). Pruning and destroying infested terminals (at first sign of wilting) should also provide some control. The most successful approach would be a combination of terminal pruning and pesticide application.



Figure 8. Codominant stems on blue spruce after ESW attack. Photo by W. Cranshaw CSU www.bugwood.org

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Always consult the product label before using any pesticide.

Useful links:

[Forest Insect and Disease Leaflet](#)

[USFS Region 1 Field Guide](#)

[USFS Region 1 Management Guide](#)

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